UNDERSTANDING THE MOTIVATION OF TERTIARY STUDENTS

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Abstract

The research in this paper suggests that we need a meta-level framework that identifies the engagement (motivation) and capability of students and suggests the best teaching methodology for those students. This paper shows that students can be divided into four stereotypes or categories that indicate the relative engagement and capability of each category of student. The relationship of these four stereotypes to the learning levels of Bloom's Cognitive sub-domain is also discussed. This paper also identifies the teaching vectors that are used in various combinations in all teaching methodologies. The appropriate use of teaching vectors is fundamental to establishing a meta-level framework that can be used to build engagement strategies.

Introduction

Traditionally, universities predominantly took the motivated best and brightest students from schools and turned them into graduates that moved into leadership roles in the community. A last century model of education was that elementary school was about creating competent consumers, secondary school was about creating competent producers and university was about creating competent managers be that in the field of science, engineering, medicine, commerce or the arts. This model has diminished as universities have broadened their student base to include adult re-entrant students, external studies students and "English as a second language" students. This diverse group of students all arrive with different motivations, capabilities and requirements.

The relative proportion of students who go to university and take programs that are of personal interest compared to students who see a university degree as a means to an end is decreasing. This subtle but potent shift has led to students who are reticent to engage on anything more than what is required to get passing grades. This has created a student population that includes both high and low ability students with widely differing degrees of real interest in their programs. Motivation is the core problem of universities today. The assumption that students were motivated to do well in their degree and strive to understand the material presented is far from certain. How do we as educators take these students and get them to engage with us throughout their studies? This paper presents a framework

that identifies different categories of students and suggests methodologies for transitioning unengaged students to engaged and passionate users.

In the last two decades there has been a remarkable technology shift which has enabled computer based learning linked to sophisticated online delivery mechanisms. It has significantly increased the number of teaching vectors beyond those that were available in traditional face-to-face education and introduced new paradigms in education. Many academics and educational administrators have been slow to effectively harness this technology shift and approach online education as an add-on in much the same way that distance education was seen in the 1990s as an add-on to normal face-to-face delivery (Fursenko et al., 2003). Students however are fully aware of the technology shift that has radically changed the face of education and student demand for interactive learning is driving online education into its next stage of development (Palloff & Pratt, 2001). The main challenge facing many universities is to rethink what face-to-face delivery is good for and get the right blend of face-to-face and online education (Brabazon, 2002).

Without a proper framework it is difficult for educators to identify how to target different categories of students in order to provide better outcomes for all categories of students. In this paper we present a framework based on categorisation of students into four main stereotypes based on students' ability and motivation. We examine all teaching vectors in terms of three parameters, bandwidth, interaction and targeting, and discuss their suitability for different student stereotypes. Finally we suggest a means of tailoring teaching methodologies so that can be used to target different student stereotypes by using appropriate combinations of teaching vectors.

Motivation of Students

Students attend university with differing motivations. At one end of the spectrum we have students that are extremely motivated to engage in all aspects of learning in their chosen program and, in all likelihood will succeed independently of the learning environment. On the other end of the spectrum we have a group of students who are not motivated by academic reasons. They are predominantly driven by external factors such as parental influence, residency or migration outcomes or, the tertiary qualification (piece of paper). Consequently a modern tertiary education system is faced with a spectrum of students ranging from students that are highly motivated to learn and understand the content through to students who are not motivated by any real desire to engage in learning.

Tertiary education is, at the same time confronted with students who exist on a spectrum from high capability to low capability. The traditional assumption is that

the students have the skills to succeed in their chosen field without remedial teaching or substantial additional assistance. The capability of students has emerged as a very significant and complex issue as a result not only of changing community expectations but also as a result of the increasing commercialisation and globalisation of tertiary education. Globalisation of education introduces cultural factors which challenge many assumptions about student capabilities that are based on local realities.

Given these two spectrums of capabilities and motivation we constructed a four quadrant matrix which has the two spectrums bisecting. This is presented in Figure 1. This matrix creates four quadrants representing four distinct classifications of students; high capability and high motivation students, high capability and low motivation students and so forth. Each of these quadrants can be typified by a stereotype student and these are discussed below. In the next four sections we describe each category of student indicated in Figure 1.

High Flyers

High flyers are students with high capability and high motivation. They are typified by students who have deep interest in the subject matter. They are explorers who will take an introduced concept and explore its ramifications. Generally they achieve high grades but High Flyers will often unintentionally sacrifice marks to explore concepts well beyond the stated core learning outcomes for a course. High Flyers may present as poor time managers as they often do not take into account pragmatic issues such diminishing returns on additional effort for assignments for example. High Flyers carry an expectation of excellence in teaching. They are quick to evaluate the standard of their lecturers and, if necessary to find strategies to compensate for a less than adequate teaching. Their motivation to engage in active learning is genuine and consequently High Flyers generally hold a hostile attitude towards any forms of academic misconduct and especially plagiarism. Typically High Flyers are the distinction and high distinction students.

Battlers

Battlers also have a high level of motivation but they do not possess or exhibit high capability. They work long hours and strive for every extra mark they can achieve. They are typified by making use of extra help during designated consulting times and often asking questions at tutorials although this sometimes does not hold due to cultural factors. Asian students for example are much less likely to ask questions than European students. In some cases their low capability is due to language factors and not necessarily technical capability as defined by the skills required in their chosen program. Language (and culture) factors clearly are a very significant factor for foreign students studying in a country where the language is quite different to their native language but it also is a significant factor

for students with immigrant backgrounds. In other cases, low capability is a direct consequence of background knowledge and skills due to inadequate or inappropriate prior learning. Students who work full, major personal, social or financial issues are another significant element in the Battler category. Battlers have the motivation to succeed given adequate support but they can also lose motivation if they fail a course repeatedly or the demands of their program are too high. Generally these students will resort to academic misconduct as a last resort measure if they see they are in jeopardy of failing.

Bored

These students are capable but they are not overly interested in the content of the program they are undertaking. They rarely display the characteristic attributes of genuine motivation by reading ahead or putting in sustained extra effort to achieve high grades. The Bored are easily distracted and often fail to submit assessment pieces due to lack of motivation. High grades achieved by the Bored are often a direct function of their capability rather than their motivation. Their grades in their program are almost always bimodal with some courses showing extremely high grades and others low passing grades or even failing grades. Bored students are also typified by their inability to respond to questions in a way that indicates an in-depth engagement with their course. This lack of in-depth engagement in acquiring knowledge and skills means that Bored students will, over time, lose the capability they possess. Bored students tend to be ambivalent about academic misconduct and may engage without getting caught or penalised.

Lost

These students are not motivated by the content of the courses within their program but are only interested in passing their courses and eventually graduating. Their motivation is entirely driven by external factors and our investigations indicate that the main factors in the case of local students are family influences or peer-group pressure. The Lost stereotype has become a significant factor in student populations due to the effects of globalisation of education, government initiatives to redress culturally disadvantaged minorities and the increasing tendency of universities to offer fee-paying programs to those who can afford them. In the case of foreign students, another significant factor is their desire to achieve permanent residence status or other migration outcomes or to satisfy government visa requirements. In many cases Lost have an inadequate background for the program they undertake and this is often compounded by a lack of communication skills. In some cases cultural issues work to preclude students from gaining the skills that are needed to succeed and this is a particularly important issue among indigenous Australians.

These students generally are fully aware of their lack of motivation and capability. Their marks in any course are generally distributed at the low end of the bell curve

and unsurprisingly their grades are mostly failing grades with occasional low passing grades. A significant portion of the students in this category look for "survival tactics" and are fully prepared to engage in academic misconduct (and especially plagiarism) in order to pass their courses. In a significant number of cases Lost will undertake organized and premeditated academic misconduct.

Figure 1: Categories of student motivation

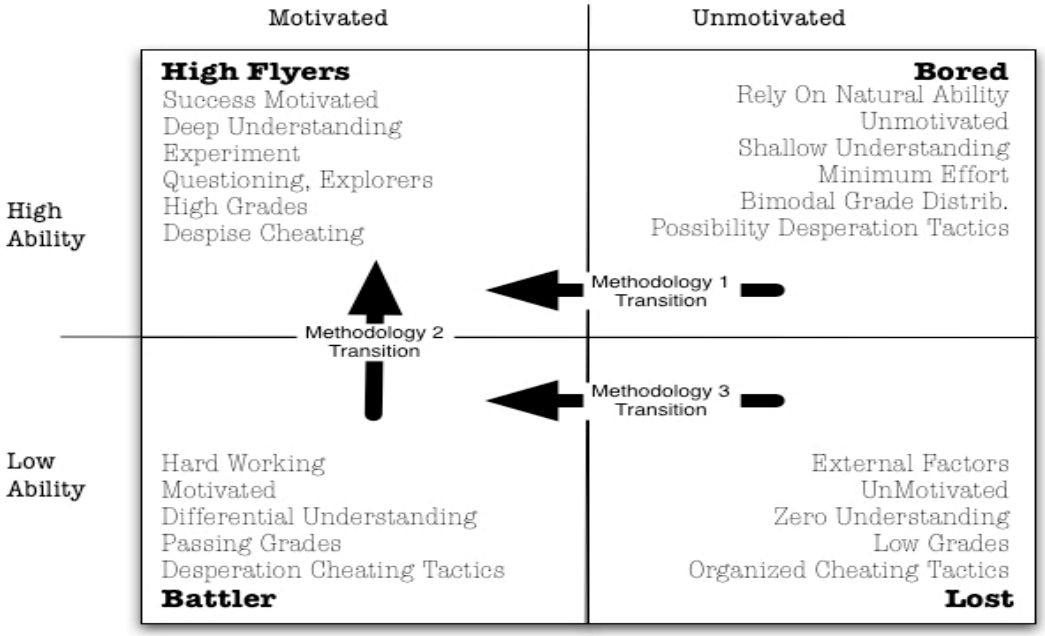

Figure 1 shows three methodologies (labelled as methodology 1, etc.) that will be discussed in the section on Engagement Strategies. It also shows two important 'gravity arrows' which indicate the consequences of an inadequate teaching methodology or poor teaching. The 'gravity arrows' highlight the risks in education and is also discussed in the section on Engagement Strategies.

The Capability vs. Motivation Matrix and Bloom's Taxonomy

Bloom's taxonomy proposes three domains of learning development: cognitive which emphasises intellectual outcomes, affective which deals with the emotional facets of learning, and psycho-motor which addresses the physical aspects. There are other approaches in education: the most common being devised by Marzano and Ebel (Anderson & Krathwohl, 2001) but Bloom's taxonomy is the best known and most widely used classification of cognitive learning objectives.

Learning is organised as a series of levels or sub-domains, and it is suggested that one cannot effectively address higher learning levels until those below them have

been covered. It is thus effectively serial in structure. The model (see Figure 2) includes six levels of thinking: knowledge, comprehension, application, analysis, synthesis and evaluation. Each sequential level not only assumes a deeper understanding of the content, but includes the previous levels as subsets of the new level. The concept can be represented as pyramidal in nature, incorporating the notion of lower and progressively higher order thinking and use of knowledge (Writing Objectives, 2004)

A criticism of Bloom's taxonomy is that all the higher level skills assessment tasks can be regarded as having hidden agendas or process tasks that are not explicit in a question or task (Ebel & Frisbie, 1991) and this has considerable ramifications to understanding the motivation or capability that each level of Bloom's hierarchy represents. Furthermore Bloom's taxonomy does not present us with any strategies to these higher levels.

Students in the Lost category tend to survive in the lower order of understanding of a subject area through rote learning of concepts. If we translate this to Bloom's Cognitive Domain it corresponds to the knowledge level of Bloom's pyramid. The lack of either capability or motivation means that the comprehension level is a challenge to these students. Few students in the Lost stereotype will attempt to demonstrate any desire to engage with higher learning levels. Battlers have the motivation to deal with the comprehension and application levels (as well as the knowledge layer) of Bloom's hierarchy but their lack of capability would severely challenge them at the analysis or higher levels. The knowledge and comprehension levels do not present any difficulty to students in the Bored category despite their lack of motivation. They also have the capability of operating at the application and analysis levels and it is at these levels that whatever motivation they have would manifest itself most strongly — they are generally not interested in consolidating their comprehension of basic concepts and skills. Student in the High Flyer category drift naturally towards the higher levels of learning such as evaluation and synthesis naturally. High Flyers can deal with both complex and abstract concepts and their interest pushes them to demonstrate their ability to evaluate concepts and/or skill in synthesising new applications of concepts.

Our analysis of Bloom's Hierarchy and its correlation to the Capability vs. Motivation matrix suggests that different categories of students (as represented by our four stereotypes) tend to operate naturally at different levels of Bloom's hierarchy. Our work confirms that there is a strong correlation between these strategies and the six levels of Bloom's hierarchy. We need strategies to move students to higher levels and, prevent students from gravitating to lower levels as indicated by the 'gravity arrows' in Figure 1.

Figure 2: Capability vs. challenge

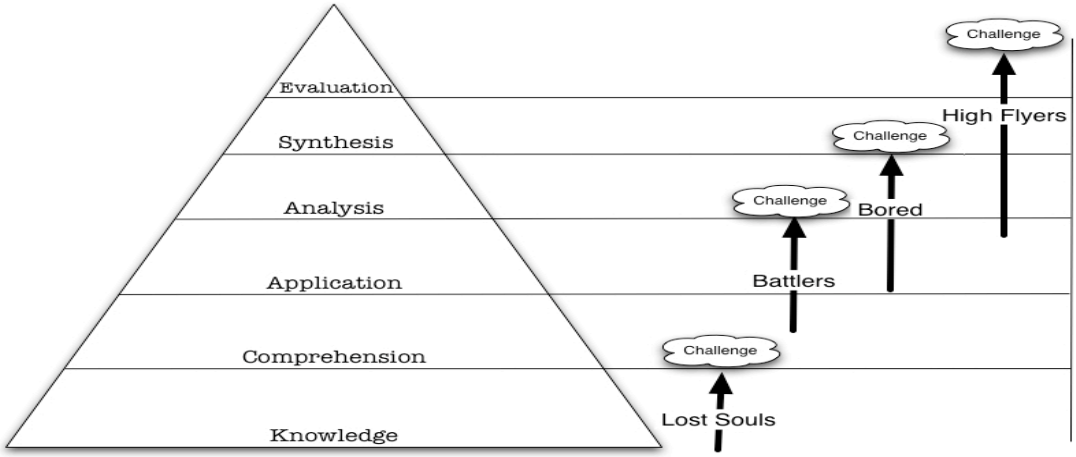

Figure 2 also shows the typical 'ability levels' and 'challenge points' of the four student stereotypes in relation to the learning levels of Bloom's hierarchy. For example the Lost tend to 'exist' at the knowledge level and the challenge for them (and consequently any engagement strategies that we construct) is to reach the comprehension level. The Battlers have the motivation to deal with the knowledge level and they will put in the effort to master the comprehension and application levels. In the case of Battlers their challenge point is the analysis level. Similar arguments are applied to the Bored and the High Flyers.

Parameters for Evaluating Teaching Vectors

Teaching vectors underpin all teaching methodologies and are generally based on one of the following three delivery modes:

- Face-to-face (f2f) teaching where students are expected to attend lectures, tutorials and practicals.
- Distance teaching (either paper-based or modern web-assisted mode) where students study from prepared materials.
- Online teaching is based on the Internet and computer-based tools. Face-to-face interaction is non-existent. In online teaching, the Internet attempts to stand alone as a single mode of delivery.

We list of all the teaching vectors (Table 1) that we have identified as significant elements in the delivery of information. We have also included several assessment vectors such as quizzes and assignments as these are often used as integral part of teaching methodologies.

Teaching vectors (as well as delivery modes) can also be broadly categorised as appropriate to face-to-face, distance and online. Face-to-face vectors imply a traditional instructor-led classroom or laboratory structure. Online vectors assume the use of computer tools and the Internet as a stand-alone delivery mechanism. Distance vectors assume that students will undertake the work involved without direct instructor involvement and it does not rely specifically on either face-to-face or online facilities.

Table 1: Teaching vectors vs. stereotypes

Interaction Method	Mode	Bandwidth	Interaction	Targeting	Group with Most Benefit
Lecture	f2f	high	low	low	Bored
Guest Speaker	f2f	high	low	low	Bored
Lecture Notes	distance	self-paced	low	low	Battlers
Lecture Video	distance	self-paced	low	low	Battlers
Podcast	distance	self-paced	low	low	High Flyers/Battlers
Practical Session	f2f	medium	medium	medium	Battlers
Practical Exercises	distance	self-paced	low	low	High Flyers
Tutorial Class	f2f	medium	medium	medium	Battlers
Tutorial Questions	distance	self-paced	low	low	High Flyers
Help Sessions	f2f	low	medium	medium	Battlers
Consultation	f2f	low	high	high	Battlers/Lost
Help Via Email	online	low	high	high	All
Discussion Board	online	medium	medium	low	Bored/Lost
Chat Room	online	high	medium	high	High Flyers Bored
Case Study	distance	self-paced	medium	medium	Bored
Research Report	distance	self-paced	medium	high	High Flyers
Work Experience	distance	medium	high	medium	Bored
Study Group	f2f	medium	high	medium	High Flyers/ Bored
Lone Assignment	distance	self-paced	low	low	High Flyers
Group Assignment	distance	self-paced	medium	medium	Lost
Online Quiz	online	self-paced	low	medium	High Flyers

Each teaching vector has different characteristics that can be evaluated in terms of the following parameters (Fursenko et a.l, 2003):

- Bandwidth — Amount of information transferred from teacher to student.
- Interaction — Extent to which the student is expected to interact with teacher.
- Targeting — Proportion of appropriate information presented at a level that meets the requirements of a student.

Bandwidth and interaction are quantifiable parameters given a well-defined scenario whereas targeting attempts to gauge the potential of a teaching vector to meet the specific requirements of a student and is therefore subject to a greater

degree of subjectivity. These parameters give us a means of determining a suitable combination of different teaching vectors appropriate to different stereotypes of students and this in turn implies methodologies to transition students to a more favourable quadrant. “Each teaching vector should be used for what it does best and student learning outcomes and satisfaction with the course as a whole will improve” (Lowe, 2002).

Examining the teaching vectors used in a teaching methodology allows us to evaluate the relative suitability of the methodology to different student stereotypes. Furthermore, by using appropriate combinations of teaching vectors allows us to tailor appropriate teaching methodologies for each category of student stereotype.

The ‘best’ — or most desirable — education is still based on the Oxbridge system of personal tutors and intense immersion in an intellectually transforming context.” (Brabazon, 2002). It can be characterized as high bandwidth, high interaction and high targeting and would apply to all four categories of student that we have described in this paper. However, the Oxbridge system represents the type of academic establishment which most students can neither afford nor gain entry to. Furthermore, few tertiary level institutions can afford to offer this type of education.

In both traditional universities and colleges (university-colleges, technical colleges and polytechnics) the face-to-face teaching mode remains the dominant form of delivery. In traditional universities the student population generally is dominated by High Flyers and, to a lesser extent, the Bored whereas in colleges there is a significantly higher proportion of Battlers as a result of generally lower entrance standards. Modern universities have led the development of distance and online modes of delivery in order to compete with traditional universities for students. Although they do attract the High Flyers and the Bored, their greater use of teaching methodologies based on distance or online vectors has encouraged a significant number of Battlers to aspire to a university education and to succeed. In all of these tertiary organisations the categorisation of students into stereotypes and development of different teaching methodologies that can be used to target different stereotypes is relevant and, in our opinion, highly desirable.

Standing apart from the above tertiary organisations is a new type of private college, owned and run by entrepreneurs strictly for profit. These colleges are not associated with any university, university-college or technical college. They rely heavily on self-paced teaching vectors with few, if any face-to-face teaching vectors. The cost benefit to the private college of this approach is obvious and their marketing promotes the benefit of self-paced learning and the fact that diploma and certificate level awards can be obtained in substantially less time than

'equivalent' awards offered by technical colleges. These private colleges offer only one teaching methodology based on self-paced vectors but it can and does attract High Flyers, Battlers and Lost for very different reasons. The attraction to High Flyers is the potential for accelerated learning. Battlers are attracted to the self-paced teaching methodology and the Lost are attracted to the promise of individualised support which is usually implied in the marketing.

Engagement Strategies

The goal of an ideal teaching methodology is to enable students to make the transition to High Flyers. However experience demonstrates that this is unrealistic and consequently our work is based on engagement strategies that will enable students to move to a quadrant which represents a favourable outcome in terms of either motivation or capability and also prevent students from gravitating to a less favourable quadrant.

We undertake our investigation on the shared understanding (gained from our experience in different forms of tertiary education at various levels) that motivation is more easily tackled than capability and thus the "movement" of students between columns is much easier or more likely than movement between rows. So we need concentrate on getting students engaged. A more passionate student is a student performing to his or her capability given that passionate students work harder to improve their skills.

Our research indicates that the most obvious beneficiaries of a teaching methodology that places a heavy focus on self-paced vectors in combination with traditional face to face vectors are the Battlers. Generally they are motivated and benefit somewhat from most face to face vectors but these vectors often carry a high bandwidth which Battlers find difficult to cope with. Hence the importance of the distance vectors which tend to be self-paced vectors and therefore allow Battlers to catch up or consolidate their learning. Battlers need time and a teaching methodology based in large part on self-paced vectors give them the time they need. Online vectors predominately are characterised by high interaction which can easily become de-motivating to Battlers.

The Bored benefit the most from a combination of face-to-face and online vectors provided the online vectors are properly targeted to provide the stimulation that the Bored student stereotype needs. They are the most likely student stereotype group to benefit are to face-to-face vectors such as lecturers and guest speakers provided they find them interesting. The high bandwidth of these vectors does not discourage them as they have a high ability to quickly absorb and assimilate knowledge.

High Flyers, in general, have not benefitted to any significant degree from either distance or online vectors at least not to the same extent as the Battlers and the Bored. The combination of ability and motivation is a potent one and it allows these students to forge ahead regardless of delivery mode. High Flyers seek out challenges and pursue them. The challenges can come in different forms but our research indicates that self-paced vectors such as practical exercises, tutorial questions, individual assignments and writing research reports are most likely to provide High Flyers with the challenges they actively seek. An engagement strategy focusing on the High Flyers need only ensure that they do not lose their motivation and gravitate into the Bored category.

Disappointingly, our research also indicates that there are few vectors that directly benefit the Lost other than individual consultation, online help (emails) and, for different reasons, group assignments. These vectors, with the exception of group assignments, are characterised by low bandwidth and high interaction which, in the case of Lost must be interpreted as providing them with individualised and highly targeted support. Our analysis suggests that the vectors that benefit the Lost are those that can be used to encourage along with the support. Targeting the Lost is a major challenge in any mode or methodology and any engagement strategy would be successful if it transitioned Lost to Battlers.

We can present our engagement strategies as three key transition methodologies (Table 2). As Figure 1 implies, methodologies 1, 2 and 3 are designed to transition students to a more favourable quadrant and they are therefore central to our Engagement Strategies. Methodologies 1 and 3 are about increasing engagement whilst methodology 2 is concerned with increasing capability for an already engaged student. Students in methodology 2 generally simply require more time to understand the content hence their best suited vectors tend to be the self paced or formative (not for marks) assessments. Methodology 1 and 3 on the other hand are more about encouraging students to engage and require a more rigorous set of vectors in order to ‘encourage’ participation. It should be noted that Table 2 only presents the key vectors that are appropriate to the three methodologies which collectively represent our Engagement Strategies. Although each decision for this table was made on the basis of our research we accept the fact that the choice of vectors we made is debatable and our work in this area is continuing.

Table 2: Key vectors appropriate for methodologies 1, 2 and 3

Methodology 1 *(Bored to High Flyers)*	*Methodology 2* *(Battlers to High Flyers)*	*Methodology 3* *(Lost to Battler)*
Lecture Guest Speaker Help Via Email Chat Room Case Study Work Experience Study Group Lone Assignment Online Quiz	Lecture Notes Lecture Video Podcast Practical Session Tutorial Class Help Sessions Consultation Help Via Email	Lecture Guest Speaker Tutorial Questions Help Sessions Consultation Help Via Email Discussion Board Group Assignment

Conclusion

Our research has highlighted the imperative need to identify students according to capability and motivation (or interest) in any given course of study. This can be achieved using the Capability vs. Motivation Matrix we have presented and shown it to be compatible and complementary to Bloom's Taxonomy. Once a student is placed within a quadrant we can look for appropriate engagement strategies to transition students into a more desirable quadrant through teaching methodologies that are built from appropriate combinations of teaching vectors. The framework we presented lends itself to further work to develop a meta-level framework that can draw on a wide range of research in order to build better engagement strategies.

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